

REFERENCE NO. OF DOCUMENT BEING CONTINUED: NNK14495022R, ATTACHMENT 001
NAME OF OFFEROR OR CONTRACTOR:

ATTACHMENT 001. STATEMENT OF WORK

NASA-Wide Acquisition of Nitrogen and Oxygen 2 (NANO 2)

April 8, 2014

REFERENCE NO. OF DOCUMENT BEING CONTINUED: NNK14495022R, Attachment 001
NAME OF OFFEROR OR CONTRACTOR:

SECTION 1. STATEMENT OF WORK: AMES RESEARCH CENTER (ARC), Bulk LN2, CLIN 001

- (a) Delivery: Delivery and acceptance of liquid nitrogen will normally be made Monday through Friday, from 7:30 AM to 3:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) Clearance Procedures: Drivers are admitted onto ARC by showing Drivers License, DD250 or equivalent commercial document and Bill of Lading.
- (c) Quantification of product delivered: ARC will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered shall be annotated on the DD250 or equivalent commercial document, if the unit of measurement is not liters then the quantity delivered shall be converted into liters and also annotated.
- (d) ARC responsibility during delivery: ARC personnel will be present to operate ARC equipment during the delivery of liquid nitrogen.
- (e) Notice for Delivery: ARC will provide a minimum of 48 hours notice before delivery of product.
- (f) Receiving storage: Current facility storage containers in use at ARC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at any time during the life of the contract.

ARC - Building Locations	No. of LN2 tanks	Gallons	MAWP (PSI)
N238	1	5,000	175
N242	1	1,200	80
N229A	1	1,500	50
N250	1	1,500	50
N244-H1	1	4,000	66

- (g) Fill Point Interface: The interface at the fill point for each tank uses 1½" CGA fittings (NI-150).
- (h) ARC Points of Contact will be listed on the Delivery Orders.

(End of section)

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SECTION 2. STATEMENT OF WORK: AMES RESEARCH CENTER (ARC), LN2 Dewars, CLIN 002

- (a) Delivery: Delivery and acceptance of liquid nitrogen will normally be made Monday through Friday, from 7:30 AM to 3:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) All deliveries for CLIN 002 shall be via "micro-bulk" into Contractor provided portable dewars that remain at ARC. The minimum acceptable dewar size is 160 liters and the maximum acceptable dewar size is 270 liters. Approximately 25 dewars are required.
- (c) Clearance Procedures: Drivers are admitted onto ARC by showing Drivers License, DD250 or equivalent commercial document and Bill of Lading.
- (d) Quantification of product delivered: ARC will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered shall be annotated on the DD250 or equivalent commercial document, if the unit of measurement is not liters then the quantity delivered shall be converted into liters and also annotated.
- (e) ARC responsibility during delivery: ARC personnel will be present to operate ARC equipment during the delivery of liquid nitrogen.
- (f) Notice for Delivery: ARC will provide a minimum of 24 hours notice before delivery of product.
- (g) ARC Points of Contact will be listed on the Delivery Orders.

(End of section)

SECTION 3. STATEMENT OF WORK: GLENN RESEARCH CENTER (GRC), CLIN 003, 004 AND 016

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, from 8:00 AM to 4:00 PM at the GRC Cleveland location; and 7:30 AM to 3:30 PM at the GRC/Plum Brook Station Sandusky location. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance Procedures:** The badging point of contact will ensure the drivers are issued temporary badges for admission onto GRC.
- (c) **Seals:** GRC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Quantification of product delivered:** Contractor shall utilize certified scales at GRC to determine quantity of product delivered.
- (e) **GRC responsibility during delivery:** GRC personnel do not have to be present to operate GRC equipment during the delivery of liquid nitrogen. However, GRC personnel are required to be present during the delivery of liquid oxygen.
- (f) **Notice for Delivery:** GRC will provide a minimum of 48 hours notice before delivery of product. Contractor will be notified at least 30 days in advance of planned high use testing. Real-time results of high use testing will require short notice changes to delivery schedule.
- (g) **Receiving storage:** Current facility storage containers in use at GRC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract. Additionally, there will be instances where propellant delivery will be made directly into Government tankers, at either the Cleveland or Sandusky Ohio location.

Location	Type	Facility	Capacity (Gallons)	MAWP
Cleveland	Nitrogen	49 (N-26)	3,600	40
Cleveland	Nitrogen	Mobile (N-27)	3,600	40
Cleveland	Nitrogen	Mobile (N-28)	3,600	42
Cleveland	Nitrogen	77 (N-51)	7,000	25
Cleveland	Nitrogen	24 (N-52)	2,000	175
Cleveland	Nitrogen	31 (N-54)	7,000	25
Cleveland	Nitrogen	5 (N-55)	3,000	250
Cleveland	Nitrogen	302 (N-57)	1,500	250
Cleveland	Nitrogen	301 (N-61)	50,000	50
Cleveland	Nitrogen	51 (N-62)	2,240	60
Cleveland	Nitrogen	402 (N-67)	6,000	250
Cleveland	Nitrogen	147 (N-69)	7,000	25
Cleveland	Nitrogen	83 (N-70)	7,000	25
Cleveland	Nitrogen	5 (N-72)	13,000	89
Cleveland	Nitrogen	16 (N-73)	13,000	89
Cleveland	Nitrogen	54 (N-75)	13,000	89
Cleveland	Nitrogen	125 (N-90)		250
Plum Brook	Nitrogen	B-2/HTF (N-79)	28,000	150

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Plum Brook	Nitrogen	SPF (N-80)	28,000	150
Plum Brook	Nitrogen	V-60-20	9,000	400
Plum Brook	Nitrogen	V-60-21	9,000	400
Plum Brook	Nitrogen	V-60-30	6,000	500
Cleveland	Oxygen	Bldg 401 (0-10)	3,600	40
Cleveland	Oxygen	Bldg 208 (0-3)	4,000	66

(g) Fill point fittings: The fill point fittings at GRC are 1½" CGA fittings (NI-150 and OX-150).

(h) GRC points of contact will be specified on delivery orders.

(End of section)

SECTION 4. STATEMENT OF WORK: GODDARD SPACE FLIGHT CENTER (GSFC), CLIN 005

- (a) Delivery: Delivery and acceptance of product will normally be made Sunday through Saturday, from 6:00 AM to 6:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) Clearance Procedures: The badging point of contact will ensure the drivers are issued temporary badges for admission onto GSFC. All personnel entering GSFC must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in Attachment 002.
- (c) Seals: GSFC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) Quantification of product delivered: GSFC will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered to each storage tank shall be annotated on the DD250 or equivalent commercial document. If the unit of measurement is not gallons then the quantity delivered shall be converted into gallons and also annotated.
- (e) GSFC responsibility during delivery: GSFC personnel do not have to be present to operate GSFC equipment during the delivery of liquid nitrogen.
- (f) Notice for Delivery: GSFC will provide a minimum of 48 hours notice before delivery of product.
- (g) Receiving storage: Current facility storage containers in use at GSFC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Facility	No. Of Tanks	Capacity (Gallons)
Bldg 4	1	5,000
Bldg 5	1	3,000
Bldg 7	1	28,000
Bldg 10	1	64,000
Bldg 11	2	2x500
Bldg 33	1	1,500
Bldg 22	1	10,000
Bldg 30	1	3,000
Bldg 34	1	3,000

- (h) Fill point fittings: The fill point fittings at GSFC are 1½" CGA fittings (NI-150).
- (i) GSFC points of contact will be specified on delivery orders.

(End of section)

SECTION 5. STATEMENT OF WORK: JET PROPULSION LABORATORY (JPL), CLIN 006

- (a) **Delivery:** Due to parking constraints and noise abatement restrictions delivery and acceptance of product will normally be made Monday through Friday, from 6:00 PM to 10:00 PM, on Saturday and Sunday, 7:00 AM to 10:00 PM.
During high use testing periods and with prior approval, delivery may be made daily from 7:00 AM to 10:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance Procedures:** The badging point of contact will ensure the drivers are issued temporary badges for admission onto JPL. All personnel entering JPL must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in attachment 002.
- (c) **Quantification of product delivered:** JPL will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered to each storage tank shall be annotated on the DD250 or equivalent commercial document. If the unit of measurement is not gallons then the quantity delivered shall be converted into gallons and also annotated.
- (d) **JPL responsibility during delivery:** JPL personnel do not have to be present to operate JPL equipment during the delivery of liquid nitrogen.
- (e) **Notice for Delivery:** JPL will provide a minimum of 48 hours notice before delivery of product. Contractor will be notified at least 30 days in advance of planned high use testing. Real-time results of high use testing will require short notice changes to delivery schedule.
- (f) **Telemetry:** At the Contractor's option and expense, the Contractor may install telemetry monitoring on each JPL owned tank (any or all). Telemetry may be used to schedule deliveries, provided JPL is notified of planned deliveries in a pre-delivery report or equivalent method. (No deliveries may be scheduled over the amount funded on the contract). No power or phone lines are available at tank locations. Transmitting frequencies for telemetry over normal cellular networks are acceptable; other frequencies should be cleared with JPL prior to installation due to frequency control on site.
- (g) **Receiving storage:** Current facility storage containers in use at JPL include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at any time during the life of the contract.

JPL Tank #	National Board #	Location	Gallons	MAWP (PSI)
3	2463	Table Mountain Observatory Wrightwood, CA. ^a	1,300	65
4	4886	11 East	1,300	65
5	3327	83 South	1,300	65
6	3698	144 North	5,200	65
20	1877	157 S/W	1,300	85
23	3737	302 East	1,300	65
24	169	300 East	1,600	250
25	4815	300 East	1,300	85
26	774	302 East	900	250
27	8942	302 East	3,000	250

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30	2516	79 East	2,500	65
31	5641	306 South	5,200	65
32	60133	248 East	11,000	250
33	62811	306 South	11,000	175
34	65539	148 South	11,000	250
35	65818	233 North	6,000	175
36	67658	144 N/E	11,000	250
37	67531	183 S/E	6,000	250
38	67660	168 N/E	6,000	250
39	68856	212 North (JPL Mesa) ^b	1,500	250
40	68868	338 North	6,000	250
41	63311	318 East	6,000	250
42	1671	11 S/E	500	250
43	71773	150 North	50,000	75

^a Table Mountain Observatory requires filling approximately 8 times per year and is located at a remote site in Wrightwood, CA, 90 miles from JPL. Delivery at the Table Mountain Observatory should be between M-F 7:00 AM to 4:00 PM.

^b The access road to the JPL Mesa has a steep grade and has sharp turns.

- (h)** Fill Point Interface: The interface at the fill point for each tank use 1½" CGA fittings (NI-150).
- (i)** JPL Points of Contact will be listed on the delivery orders.
- (j)** JPL requires that the DD250 or equivalent commercial document be signed by the JPL Plant Protection Officer prior to departing and a copy of the completed form shall be left with the Plant Protection Officer. Arrival time and departure time shall be stated on the form.

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- (k) Maintenance and repair: Maintenance and repair of LN2 storage systems may be required on an occasional basis, typically less than 5 times per calendar year. Components requiring maintenance and repair services include, but are not limited to, fill manifolds, valves, gages, vaporizers, CGA connections, and pumps. The contractor shall identify to JPL required or suggested maintenance and repair items associated with the LN2 delivery and storage equipment. JPL may also identify items requiring maintenance and repair. JPL retains full responsibility for all Government owned LN2 equipment. The Contracting Officer administering the applicable delivery order shall be notified by the contractor of the maintenance or repair requirement and shall issue a delivery order modification with negotiated pricing (utilizing the labor rates established in this contract). Maintenance and repair requirements shall not exceed \$25,000.00 per occurrence.

Note: JPL may require emergency repair work performed within 24 hours of authorization to proceed.

(End of section)

SECTION 6. STATEMENT OF WORK: JOHNSON SPACE CENTER (JSC) CLIN 007 (LN2 grade B)

- a) Delivery: Delivery and acceptance of product will normally be made Monday through Friday, 7:00 AM to 3:00 PM. However, during high use testing or under unusual or circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- b) Clearance procedures: Drivers are issued temporary badges for admission onto JSC by showing Drivers License, DD250 or equivalent commercial document, and Bill of Lading.
- c) Seals: JSC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- d) Quantification of product delivered: JSC shall use certified scales at JSC Bldg 419.
- e) Notice for Delivery: JSC will provide a minimum of 48 hours notice before delivery of product. Contractor will be notified at least 30 days in advance of planned high use testing. Real-time results of testing will require short notice changes to delivery schedule.
- f) JSC responsibility during delivery: JSC personnel will be present and operate JSC equipment during the delivery of liquid nitrogen.
- g) Receiving Storage: Current facility storage containers in use at JSC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Facility	No. Of Tanks	Capacity (Gallons)	MAWP (psi)	Relief Valve (psi)
Bldg 32	1	28,000	165	85
Bldg 32	1	28,000	165	85
Bldg 32	1	28,000	165	85
Bldg 32	1	28,000	165	85
Bldg 32	1	24,000	165	85
Bldg 32	1	24,000	100	85
Bldg 33	1	24,000	100	75

Note: Six tanks at Bldg 32 are manifolded together with one fill point.

- h) Fill point fittings: The fill point fittings at JSC are 1½" CGA fittings (NI-150).
- i) JSC points of contact will be specified on delivery orders.

(End of section)

SECTION 7. STATEMENT OF WORK: JOHNSON SPACE CENTER (JSC) CLIN 008 (LN2 mod grade C)

- a) Modified Grade C requirements for purity/impurity limitations are as follows:
- a. Purity: $\geq 99.995\%$
 - b. Oxygen: ≤ 10 ppm
 - c. Hydrocarbons, as Methane: ≤ 1 ppm
 - d. Argon: ≤ 30 ppm
 - e. Water: ≤ 10 ppm
 - f. Carbon Monoxide: ≤ 10 ppm
 - g. Carbon Dioxide: ≤ 10 ppm
 - h. Hydrogen: ≤ 0.5 ppm
- b) Delivery: Delivery and acceptance of product will normally be made Monday through Friday, 7:00 AM to 3:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- c) Clearance procedures: Drivers are issued temporary badges for admission onto JSC by showing Drivers License, DD250 or equivalent commercial document, and Bill of Lading.
- d) Seals: JSC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- e) Quantification of product delivered: Contractor shall use certified scales at JSC Bldg 419.
- f) Notice for Delivery: JSC will provide a minimum of 48 hours notice before delivery of product.
- g) JSC responsibility during delivery: JSC personnel will be present and operate JSC equipment during the delivery of liquid nitrogen.
- h) Receiving Storage: Current facility storage containers in use at JSC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Facility	No. Of Tanks	Capacity (Gallons)
Bldg 31	1	15,000

- i) Fill point fittings: The fill point fittings are 1½" CGA fittings (NI-150).
- j) JSC points of contact will be specified on delivery orders.

(End of section)

SECTION 8. STATEMENT OF WORK: JOHNSON SPACE CENTER (JSC) CLIN 017 (LO2 ABO)

- a) Delivery to Ellington Field/AOD: Delivery and acceptance of product will normally be made 6:30 AM to 3:00 PM every other Tuesday. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- b) Clearance procedures: Drivers are issued temporary badges for admission onto JSC by showing Drivers License, DD250 or equivalent commercial document, and Bill of Lading.
- c) Seals: JSC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- d) Product analysis: Contractor shall perform laboratory analysis for Purity, Odor and Moisture in accordance with MIL-PRF-27210J Table II, "Quality Conformance Inspection". Following product delivery, JSC will perform additional laboratory analysis in accordance with Table II, "Periodic Inspection".
- e) Quantification of product delivered: JSC will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered shall be annotated on the DD250 or equivalent commercial document. If the unit of measurement is not tons then the quantity delivered shall be converted into tons and also annotated.
- f) Notice for Delivery: JSC will provide a minimum of 48 hours notice before delivery of product
- g) Receiving storage/delivery locations:

Facility	No. Of Tanks	Capacity (Gallons)	MAWP (psi)
Ellington Field	3	3x600	50

- h) Fill point fittings: The fill point fittings at JSC-Ellington Field are 1½" CGA fittings (OX-150).
- i) JSC points of contact will be specified on delivery orders.

(End of section)

SECTION 9. STATEMENT OF WORK: KENNEDY SPACE CENTER/CAPE CANAVERAL AIR FORCE STATION (KSC/CCAFS), CLIN 009 (LN2 Grade B)

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, 5:30 AM to 4:30 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance Procedures:** The badging point of contact will ensure the drivers are issued temporary badges for admission onto KSC/CCAFS. All personnel entering KSC/CCAFS must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in attachment XXX.
- (c) **Seals:** KSC/CCAFS requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Quantification of product delivered:** KSC/CCAFS will accept certified scale measurements from the contractor source to determine quantity of product delivered. If product is offloaded using the trailer pump, KSC/CCAFS will accept the measurements from the flow meter.
- (e) **KSC/CCAFS responsibility during delivery:** KSC/CCAFS personnel will be present and operate KSC/CCAFS equipment during the delivery of liquid nitrogen.
- (f) **Notice for Delivery:** KSC/CCAFS will provide a minimum of 3 days notice before delivery of product.
- (g) **Receiving storage:** Current facility storage containers in use at KSC/CCAFS include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Location	Type	Bldg	Capacity (Gallons)	MAWP (PSI)*	Tanker Trailer Off-loading Stations	Comments
KSC	Nitrogen	K7-314	10,000	60	1	
KSC	Nitrogen	M7-557	5,000	250	1	
KSC	Nitrogen	LETf	15,000	175	1	
KSC	Nitrogen	K7-314	2,000	50	1	Recharger
KSC	Nitrogen	K7-314	3,000	50	1	Recharger
KSC	Nitrogen	K7-314	4,000	50	1	Mobile Tankers

- (h) **Fill Point Interfaces:** KSC/CCAFS will provide the 3" flexible hose to transfer from contractor tanker to receiving equipment.

Liquid Nitrogen: 3" Cryogenic, Female Nut, with 4.25-4 ACME LH threads at the end of the facility flex hose which shall connect to the Tanker Liquid Fill/Withdrawal Connection.

- (i) **KSC Points of Contact** will be listed on the Delivery Orders.

(End of section)

SECTION 10. STATEMENT OF WORK: KENNEDY SPACE CENTER/CAPE CANAVERAL AIR FORCE STATION (KSC/CCAFS), CLIN 018, 019, and CLIN 020 (LO2 Grade A)

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, 5:30 AM to 4:30 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance Procedures:** The badging point of contact will ensure the drivers are issued temporary badges for admission onto KSC/CCAFS. All personnel entering KSC/CCAFS must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in attachment XXX.
- (c) **Seals:** KSC/CCAFS requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Quantification of product delivered:** KSC/CCAFS will accept certified scale measurements from the contractor source to determine quantity of product delivered.
- (e) **KSC/CCAFS responsibility during delivery:** KSC/CCAFS personnel will be present and operate KSC/CCAFS equipment during the delivery of liquid oxygen.
- (f) **Notice for Delivery:** KSC/CCAFS will provide a minimum of 3 days notice before delivery of product. Orders for delivery of 5 or more tankers will provide a minimum of 7 days notice.
- (g) **Receiving storage:** Current facility storage containers in use at KSC/CCAFS include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at any time during the life of the contract.

Location	Type	Bldg	Capacity (Gallons)	MAWP (PSI)	Tanker Trailer Off-loading Stations	Comments
KSC	Oxygen	K7-412	4,000	50	1	Mobile Tankers
CCAFS	Oxygen	SLC-37B	250,000	30	5	
CCAFS	Oxygen	SLC-41	465,000	200	6	
CCAFS	Oxygen	SLC-41	28,000	165	2	

- (h) **Supplier equipment requirements:** Liquid oxygen tankers are required to have a minimum pressure off-load capability of 40psig. Pump off-loading is not permissible.
- (i) **Fill Point Interfaces:** KSC/CCAFS will provide the 3" flexible hose to transfer from contractor tanker to receiving equipment.
Liquid oxygen;

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3" ACME Cryogenics, Female Nut, with 4.25-4 ACME threads at the end of the facility flex hose which shall connect to the Tanker Liquid Fill/Withdrawal Connection.

(j) KSC Points of Contact will be listed on the Delivery Orders.

(End of section)

**SECTION 11. STATEMENT OF WORK: KENNEDY SPACE CENTER/CAPE CANAVERAL AIR FORCE STATION
(KSC/CCAFS), CLIN 021 (SLS LO2 modified grade A)**

- (a) LO2 shall be delivered to MIL-PRF-25508H except the Purity and Impurity values listed in Table 1 modified as follows:
- a. Purity, minimum: 99.85%
 - b. Impurities, maximum: 1500 ppm
- (b) Delivery: Delivery and acceptance of product will normally be made Monday through Friday, 5:30 AM to 4:30 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (c) Clearance Procedures: The badging point of contact will ensure the drivers are issued temporary badges for admission onto KSC/CCAFS. All personnel entering KSC/CCAFS must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in attachment XXX.
- (d) Seals: KSC/CCAFS requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (e) Quantification of product delivered: KSC/CCAFS will accept certified scale measurements from the contractor source to determine quantity of product delivered.
- (f) KSC/CCAFS responsibility during delivery: KSC/CCAFS personnel will be present and operate KSC/CCAFS equipment during the delivery of liquid oxygen.
- (g) Notice for Delivery: Orders for delivery of 5 or more tankers KSC/CCAFS will provide a minimum of 7 days notice.
- (h) Receiving storage: Receiving equipment will be filled by pressure off-load of contractor tanker. Current facility storage containers in use at KSC/CCAFS include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Location	Type	Bldg	Capacity (Gallons)	Tanker Trailer Off-loading Stations	Required minimum tanker pressure for off-load (psi)	Comments
KSC	Oxygen	LC-39B	900,000	5	32	99.85% purity

- (i) Fill Point Interfaces:
- Liquid oxygen; 3" ACME Cryogenics, Female Nut, with 4.25-4 ACME threads at the end of the facility flex hose which shall connect to the Tanker Liquid Fill/Withdrawal Connection.
- KSC/CCAFS will provide the 3" flexible hose to transfer from contractor tanker to receiving equipment.
- (j) KSC Points of Contact will be listed on the Delivery Orders.

(End of section)

SECTION 12. STATEMENT OF WORK: LANGLEY RESEARCH CENTER (LaRC), CLIN 010, 011 AND 022

- (a) Delivery: Delivery and acceptance will normally be made Monday through Friday, from 7:00 AM to 2:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) Clearance Procedures: The badging point of contact will ensure the drivers are issued temporary badges for admission onto LaRC. Badges are issued at the Pass Office, Building 1308, Monday through Friday between the hours of 7:00 AM to 3:00 PM.
- (c) Seals: LaRC requires the tanker to be sealed to prevent tampering, with each seal marked by a unique alphanumeric identifier (serial number).
- (d) Quantification of product delivered: LaRC will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered to each storage tank shall be annotated on the DD250 or equivalent commercial document. If the unit of measurement is not gallons then the quantity delivered shall be converted into gallons and also annotated.
- (e) Notice for Delivery: LaRC will provide a minimum of 48 hours notice before delivery of product.
- (f) LaRC responsibility during delivery: LaRC personnel will be present and operate LRC equipment during delivery.
- (g) Receiving storage: Current facility storage containers in use at LaRC include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

LaRC - Locations:	No. of tanks	Capacity (gallons)	Delivery Pressure (PSIG)	Receiving Container Reference Designator	LN2 Grade (B or C)
Bldg. B-648	2 (LN2)	6,000 6,000	50	Unit 44 Unit 54	B B
Bldg. B-1148	1 (LN2)	1,500	50	Unit 108	B
Bldg. B-1202	1 (LN2)	1,800	50	Unit 28	B
Bldg. B-1205	2 (LN2)	3,000 3,000	50	Unit 43 Unit 51	B B
Bldg. B-1236	2 (LN2)	3,000 6,000	50	Unit 31 Unit 33	B B
Bldg. B-1242	2 (LN2)	28,000 28,000	50	Unit 38 Unit 39	B B
Bldg. B-1247	2 (LN2)	6,000 6,000	50	Unit 6 Unit 8	C C
Bldg. B-1250	1 (LN2)	14,000	50	Unit 42	B
Bldg. B-1265	1 (LN2)	9,000	50	Unit 39 LNT	C
Bldg. B-1267	1 (LN2)	500	50	Unit 279	B
Bldg. B-1293C	1 (LN2)	1,500	50	Unit 32	B
Bldg. 1265	1(LO2)	28,000	50	Unit LXT-38	n/a

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(h) Fill Point interfaces:

LN2; 1½" CGA fitting (NI-150)

LO2; 1½" CGA fitting (OX-150)

(i) LRC Points of Contact will be listed on the Delivery Orders.

(End of section)

SECTION 13. STATEMENT OF WORK: MARSHALL SPACE FLIGHT CENTER (MSFC), CLIN 013 AND 023

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, from 7:00 AM to 2:00 PM. However, under unusual circumstances, the Contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays. Liquid nitrogen deliveries to the U.S. Army Redstone Arsenal will be received at MSFC receiving prior to delivery to the Army.
- (b) **Clearance Procedures:** Deliveries are required to pass through the Gate 1 (Martin Road) security checkpoint. Drivers are issued temporary badges for admission onto MSFC by showing Drivers License, DD250 or equivalent commercial document and Bill of Lading. Then proceed to Building 4659 for weighing prior to offload.
- (c) **Seals:** MSFC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Quantification of product delivered:** The contractor will use certified scales at MSFC to determine quantity of product delivered.
- (e) **Notice for Delivery:** MSFC will normally place orders by the Friday of each week preceding the week the delivery is to be made. Under unusual circumstances orders with a minimum of 48 hours notice shall be accepted.
- (f) **MSFC responsibility during delivery:** MSFC personnel have to be present to operate MSFC equipment during the delivery of liquid nitrogen and liquid oxygen.
- (g) **Receiving storage:** Current facility storage containers in use at MSFC and Redstone Arsenal include those which are listed below. However, the Government reserves the right to add, withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Location	Type	Bldg	Tank No.	Capacity (Gallons)	MAWP (PSI)	Loading Stations	Comments
MSFC	Nitrogen	4659	1	25,200	100	3	The 3 loading station supply all tanks
			2	25,200	100		
			3	25,200	100		
			4	25,200	100		
			7	28,000	79		
			8	28,000	79		
MSFC	Nitrogen	4707	1	13,500	107.6	1	
MSFC	Nitrogen	4718	1	25,200	100	1	
			2	28,000	165		
MSFC	Nitrogen	4619	1	13,500	107.6	1	
			2	13,500	107.6		
Redstone	Nitrogen	7156	1	9,000	250	1	
Redstone	Nitrogen	8890	1	13,000	250	1	
Redstone	Nitrogen	8890	1	9,000	250	1	
Redstone	Nitrogen	A-7848	1	6,000	250	1	
Redstone	Nitrogen	A-7851	1	6,000	70	1	
Redstone	Nitrogen	A-7859	1	6,000	250	1	

REFERENCE NO. OF DOCUMENT BEING CONTINUED: NNK14495022R, Attachment 001
NAME OF OFFEROR OR CONTRACTOR:

Redstone	Nitrogen	A-7879A	1	14,000	65	1	
Redstone	Nitrogen	4500	1	6,000	250	1	
MSFC	Oxygen	4522/TS-500	1	28,000	70	1	See Note 1.
MSFC	Oxygen	4540/TS-116	1	28,000	70	1	See Note 2.
			2	14,000	50		
MSFC	Oxygen	4670	1	26,500	100	1	See Note 3.
			2	26500	100		
			3	26,500	100		

Note 1: Tank has pressure coils for transferring liquid oxygen to run tanks, and miscellaneous valves and piping to the test stand (TS-500) interface. MSFC tanks have pumps for unloading vendor tankers and transfer to test stand run tanks.

Note 2: Tanks have pressure coils for liquid oxygen transfer to run tanks, and miscellaneous valves and piping to the test stand (TS-116) interface. MSFC tanks have pumps for unloading vendor tankers and transfer to test stand run tanks.

Note 3: Tanks have pumps for unloading vendor tankers and transfer to test stand run tanks.

(h) MSFC points of contact will be specified on delivery orders.

(End of Section)

SECTION 14. STATEMENT OF WORK: MICHLOUD ASSEMBLY CENTER (MAF), CLIN 012

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, from 7:00 AM to 3:00 PM. However, under unusual circumstances, the contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance Procedures:** Drivers are issued temporary badges for admission onto MAF by showing Drivers License, DD250 or equivalent commercial document and Bill of Lading.
- (c) **Seals:** MAF requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Quantification of product delivered:** MAF will accept the contractor's flow meter quantification of product delivered. Quantity of product delivered shall be annotated on the DD250 or equivalent commercial document. If the unit of measurement is not tons then the quantity delivered shall be converted into tons and also annotated.
- (e) **MAF responsibility during delivery:** MAF personnel have to be present during the delivery of liquid nitrogen.
- (f) **Receiving Storage:** Current facility storage containers in use at MAF include those which are listed below. However, the Government reserves the right to withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Facility	No. Of Tanks	Capacity (Gallons)	MAWP
Bldg 175	1	30,000	250

- (g) **Telemetry:** At the Contractor's option and expense, the Contractor may install telemetry monitoring on the MAF storage tank. Telemetry may be used to schedule deliveries, provided MAF is notified of planned deliveries. (No deliveries may be scheduled over the amount funded on the contract). No power or phone lines are available at the tank location. Transmitting frequencies for telemetry over normal cellular networks are acceptable; other frequencies should be cleared with MAF prior to installation due to frequency control on site.
- (h) **Fill point fittings:** The fill point fittings at MAF are 1½" CGA fittings (NI-150).
- (i) **MAF points of contact** will be specified on delivery orders.

(End of section)

SECTION 15. STATEMENT OF WORK: STENNIS SPACE CENTER (SSC), CLIN 014, 015, 024, AND 025

- (a) **Delivery:** Delivery and acceptance of product will normally be made Monday through Friday, from 7:00 AM to 10:00 PM. However, under unusual circumstances, the contractor agrees to deliver product 24 hours a day, 7 days a week, including holidays.
- (b) **Clearance:** All personnel entering SSC must be badged for access in accordance with the Personnel Identity Verification (PIV) requirements described in attachment 002.
- (c) **Seals:** SSC requires the tanker to be sealed to prevent tampering; however, a serialized seal is not required.
- (d) **Product Sampling Method –** The Contractor’s sampling method shall be approved by the government. As a validation of the contractor’s sampling method, the contractor must provide laboratory test data showing that sampling and analysis results are equivalent (within +/- 5 PPM Total Hydrocarbons (THC) for LO2 and LN2) to results obtained utilizing the Cryogenic Sampling Procedure (i.e., Cosmodyne method) in ASTM F310-07 “Standard Practice for Sampling Cryogenic Aerospace Fluids” Paragraph 3.2 and 7.0. This Cosmodyne sample shall be from a freshly filled LO2/LN2 delivery trailer immediately prior to or after the contractor’s proposed sampling method has been utilized so that a direct comparison can be evaluated. The Cosmodyne shall then be analyzed by an independent laboratory at the contractor’s expense. This test shall be performed at the onset of the contract prior to any LO2 or LN2 deliveries to validate the contractor’s sampling method is accurate and then performed quarterly throughout the duration of the contract to verify continued compliance. Sample comparison results shall be provided to the government within 10 calendar days of being analyzed. Any results exceeding the +/- 5 PPM requirement will be cause for noncompliance. In addition, the government reserves the right to perform random Cosmodyne testing of LO2 and LN2 trailers at the contractor’s facility at the government’s expense.
- (e) **Quantification of product delivered:** The contractor will use certified scales at SSC to determine quantity of product delivered.
- (f) **Notice for Delivery:** SSC will normally place orders by the Thursday of each week preceding the week the delivery is to be made. Under unusual circumstances orders with a minimum of 48 hours notice shall be accepted.
- (g) **SSC responsibility during delivery:** SSC personnel have to be present to operate SSC equipment during delivery.
- (h) **Receiving storage:** Current containers in use include those which are listed below. However, the Government reserves the right to withdraw, change, or substitute receiving containers at anytime during the life of the contract.

Type	Facility	No. of Tanks	Capacity (Gallons)
Nitrogen	HPGF	4	55,000 3X27,000
Nitrogen	E1	1	28,000
Oxygen	B2	1	25,000
Oxygen	E1	1	28,000
Oxygen	E2	1	3,000
Oxygen	E3	3	11,000 2,000 600
Oxygen	Barges	5	5X95,000

- (i) **Fill point fittings:** SSC has fittings to accommodate the vendor.
- (j) **SSC points of contact** will be specified on delivery orders.

(End of section)